

a piezoelectric element suspended between two sections of the swing arm by an adhesive, the piezoelectric element having a voltage-impressing electrode for allowing a fine arcuate movement of the free end around the coarse rotation axis in response to an applied voltage;

Amend
an FPC board having a resin base and a feeding line embedded in the resin base for feeding power to the voltage-impressing electrode,

wherein a portion of the resin base is removed to expose a portion of the feeding line that extends onto the electrode; and a direct electrical connection between the feeding line and the voltage impressing electrode at the exposed portion of the feeding line.

2. (amended) The magnetic head actuator according to Claim 1, wherein the electrical connection comprises an ultrasonic bond, wherein a portion of the material of the feeding line resides in the voltage impressing electrode.

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9. (amended) The magnetic head actuator according to Claim 8, wherein the direct electrical connection comprises an ultrasonic bond, wherein a portion of the material of the feeding line resides in the voltage impressing electrode.

REMARKS

Claims 1-14 are pending in the application. Claims 1-2 and 9 have been amended. No new matter has been introduced by the amendment.

Rejection Under 35 U.S.C. § 102(e)

Claim 1-2, 7-9, and 14 have been rejected over Wada et al. This rejection is believed overcome in view of the amendment of claims 1-2 and 9 together with the following remarks.

Claim 1 has been amended to recite that the piezoelectric element is suspended between two sections of the swing arm by an adhesive. The piezoelectric element

includes a voltage-impressing electrode. Claim 1 has further been amended to recite that a direct electrical connection exists between the feeding line and the voltage impressing electrode. One embodiment of the claimed adhesive suspension is illustrated in FIG. 3 of the Applicants' drawings. As described by the Applicants on page 8, lines 7-10 of their application, the clearances at both ends of piezoelectric element 22 are filled with an insulating non-shrinkable resin 24. Direct electrical contacts from the feeding lines to the piezoelectric elements are made to the voltage-impressing electrodes 22V, as illustrated in FIGs. 2, 4, and 8-20 of the Applicants' drawing.

In similarity with claim 1, independent claim 8 also recites that a feeding line is joined to a voltage-impressing electrode of a piezoelectric element by a direct electrical connection. The Applicants disclose several different embodiments of the direct electrical connection in their specification. These embodiments are recited in dependent claims 9-12.

The Applicants respectfully assert that Wada et al. differs from their claimed invention at least because Wada et al. teaches the attachment of the second conductor member (800(b)) to actuator connection pads (22). The connection pads (22) are, in turn, connected to the terminal electrodes of the actuator (11). In contrast, the magnetic head actuator of the instant invention includes an electrical connection directly between the feeding line and the voltage-impressing electrode.

The Applicants further assert that the particular arrangement recited in claim 1 facilitates an improved direct electrical connection to the voltage-impressing electrodes of the piezoelectric elements. This feature of the Applicants' invention is not suggested or disclosed by Wada et al.

Claims 2 and 9 have been amended to recite the structural details of the claimed ultrasonic bond. In particular, the ultrasonic bond electrical connection is a bond in which a portion of the material of the feeding line resides in the voltage-impressing electrode. This is a distinct structural characteristic of an electrical connection made by an ultrasonic bond. Accordingly, the Applicants respectfully assert that claims 2 and 9 should not be treated as product-by-process claims. Claims 2 and 9, as amended, recite distinct structural features of the claimed electrical connection.

The Applicants respectfully assert that claims 2-7 are allowable at least in view of the amendment remarks pertaining to claim 1 from which they depend.

Claims 9-14 are believed allowable in view of the foregoing remarks pertaining to claim 8 from which they depend.

Rejection Under 35 U.S.C. § 103(a)

Claims 3 and 10 have been rejected over Wada et al. The Applicants respectfully assert that Wada et al. do not suggest or disclose the claimed direct electrical connection nor the adhesive suspension mounting technique recited in amended claim 1. The arguments set forth above are incorporated herein. Claim 3 further recites that the electrical connection comprises Au ball bond. As acknowledge on page 4 of the instant Office Action, Wada et al. does not specify the means by which the piezoelectric element electrodes are connected to the FPC trace lines. In view of the failure of Wada et al. to suggest or disclose a direct electrical connection made by Au ball bond, the Applicants respectfully assert that claim 3 distinguishes over Wada et al.

In view of the failure of Wada et al. to suggest or disclose a direct electrical connection and, in particular, a direct electrical connection by means of Au ball bond, the Applicants respectfully assert that claim 10 distinguishes over Wada et al.

Claims 6 and 13 have been rejected over Wada et al. in view of Budde et al. The Applicants respectfully assert that the addition of Budde et al. does not overcome the deficiency of Wada et al. Claim 6 depends from claim 1 and further limits claim 1 to a particular number and arrangement of piezoelectric elements. Neither Wada et al. nor Budde et al. suggest or disclose a direct electrical connection between a feeding line and a voltage-impressing electrode of an adhesively suspended piezoelectric element. Accordingly, the Applicants respectfully assert that claim 6 distinguishes over the combination of cited references. Claim 13 is believed to distinguish over Wada et al. and Budde et al. in view of the foregoing remarks pertaining to claim 8 from which it depends.

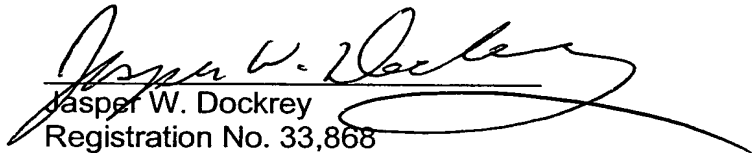
Claims 4-5 and 11-12 have been rejected over Wada et al. in view of Pattanaik. This rejection is believed overcome in view of the amendment and remarks pertaining to claim 1 from which claims 4 and 5 depend. This rejection is also believed overcome in

view of the remarks pertaining to claim 8 from which claims 11 and 12 depend. Each of claims 4-5 and 11-12 recite particular structure for establishing the direct electrical connection recited in claims 1 and 8.

The Applicants have carefully examined the additionally cited reference to Imaino et al. and found this reference not to be relevant to the invention as claimed. Imaino et al. fails to suggest or disclose the claimed arrangement of a piezoelectric element mounted in the swing arm and the direct electrical connection between a feeding line and a voltage-impressing electrode on the piezoelectric element.

Applicants have made a novel and non-obvious contribution to the art of magnetic head actuator technology. The claims at issue are believed to distinguish over the cited references and to be in condition for allowance. Accordingly, such allowance is now earnestly requested.

Respectfully submitted,


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APPENDIX

1. (amended) A magnetic head actuator having a finely movable tracking device comprising:

a swing arm having a magnetic head at a free end and reciprocally movable around a coarse rotation axis at a base of the swing arm;

a piezoelectric element [mounted in] suspended between two sections of the swing arm by an adhesive, the piezoelectric element having a voltage-impressing electrode for allowing a fine arcuate movement of the free end around the coarse rotation axis in response to an applied voltage;

an FPC board having a resin base and a feeding line embedded in the resin base for feeding power to the voltage-impressing electrode,

wherein a portion of the resin base is removed to expose a portion of the feeding line that extends onto the electrode; and [an] a direct electrical connection between the feeding line and the voltage impressing electrode at the exposed portion of the feeding line.

2. (amended) The magnetic head actuator according to Claim 1, wherein the electrical connection comprises an ultrasonic bond, wherein a portion of the material of the feeding line resides in the voltage impressing electrode.

9. (amended) The magnetic head actuator according to Claim 8, wherein the direct electrical connection comprises an ultrasonic bond, wherein a portion of the material of the feeding line resides in the voltage impressing electrode.